CLAIMS

1. A method of deriving a function for classifying items of currency, the method comprising processing training data vectors corresponding to features of a plurality of currency items, and deriving a support vector machine classification function involving a plurality of support vectors.

2. A method as claimed in claim 1 comprising expressing the support vector machine classification function in terms of a subset of the training data vectors, where the subset differs from the support vectors, or where the size of said subset is less than the size of the set of support vectors.

3. A method as claimed in any preceding claim wherein the support vector classification function is in the form $g(x) = x^T \sum_{i \in SVS} \alpha_{o,i} d_i x_i + b_0$

4. A method as claimed in any preceding claim, wherein the support vector machine classification function involves a kernel function corresponding to a mapping of a first space corresponding to the space of input data to a second space, and determining a subset of the training data vectors whose image in the second space is representative of the image of the training data in the second space, wherein the support vector machine classification function is expressed in terms of said subset.

5. A method as claimed in claim 4 wherein the subset is such that the image of each element of the training data set can be expressed approximately as a linear combination of the image of elements of the subset.

6. A method as claimed in claim 5 wherein the subset is such that a measurement of the approximation meets a predetermined condition.

7. A method as claimed in any one of claims 4 to 6 wherein the step of selecting a subset comprises:

(a) deriving a temporary subset;

(b) calculating the value of a fitness function representing the closeness of an approximation of the image of the remaining elements of the data set in terms of the image of the temporary subset;

(c) deriving another temporary subset and repeating step (b); and

(d) comparing the values of the fitness function for each temporary subset, and selecting the temporary subset for which the value of the fitness function indicates the closest approximation.

8. A method as claimed in claim 7 in which steps (a) to (d) are repeated to form a sequence of temporary subsets of increasing or decreasing size.

9. A method as claimed in claim 7 or claim 8 wherein the steps (a) to (d) are repeated until a predetermined condition is met, such as until a fitness function meets a predetermined condition, for example, that the value of the fitness function is less than or equal to a predetermined value, or greater than or equal to a predetermined value, and/or the subset is of a predetermined size, and/or until $K_{s,s}$, as hereinbefore defined, is no longer numerically invertible.

10. A method as claimed in any one of claims 8 to 12 wherein the fitness function uses the kernel function

11. A method as claimed in any one of claims 4 to 10 wherein the support vector classification function is in the form $g(\mathbf{x}_i) = \sum_{j=1}^{L} w_{z0,j} k(x_j, x_i) + b_0$

12. A method as claimed in any preceding claim comprising deriving a plurality of measurements from at least one currency sensor and a plurality of currency items, and forming the training data set from the measurements.

13. A method as claimed in any preceding claim wherein individual elements of the data set comprise a plurality of measurements corresponding to a plurality of characteristics of the sensed items.

14. A method as claimed in claim 12 or claim 13 wherein the currency sensor is a document sensor.

15. A method as claimed in claim 14 wherein the document sensor is a banknote sensor.

16. A method as claimed in claim 12 or claim 13 wherein the currency sensor is a coin sensor.

17. A method as claimed in any one of claims 4 to 16 wherein the kernel function is a Gaussian, polynomial, sigmoid, hyperbolic tangent or spline kernel.

18. A classification function derived by a method according to any preceding claim.

19. A classification function in the form of a support vector machine involving constants representing at least a kernel function, a weight, and a set

of support vectors, or a subset of support vectors representing data under the image of a mapping corresponding to the kernel function.

20. A classification function according to claim 18 or claim 19 in the form of either $g(x) = x^T \sum_{i \in SVS} \alpha_{o,i} d_i x_i$ or $g(\mathrm{x}_i) = \sum_{j=1}^{L} w_{z0,j} k(x_j, x_i) + b_0$.

21. A method of adapting a currency validator comprising storing a classifying function according to any one of claims 18 to 20.

22. A method of classifying a currency item in a currency classifier comprising deriving at least one measurement of the item from at least one currency sensor, classifying the item using a classification function according to any one of claims 18 to 20.

23. A validator comprising means for sensing currency items to produce measured values representing characteristics of the items, means storing a function according to any one of claims 18 to 20, and means for validating a currency item using the measured values and the function.